

We claim:

- 1 1. A beam on demand system comprising:
  - 2 at least one radio;
  - 3 a plurality of amplifiers each having an input switchably coupled to the at
  - 4 least one radio via a switch matrix and to at least one beam former where each
  - 5 amplifier has at least one output coupled to an antenna array; and
  - 6 a controller configured to receive an output transmission power level signal
  - 7 from each of the plurality of amplifiers and where the controller generates a control
  - 8 signal to the switch matrix causing the switch matrix to couple or uncouple an
  - 9 amplifier to the at least one radio where the control signal is based on the received
  - 10 transmission power level of the amplifier and a threshold transmission power.
- 1 2. The beam on demand system of claim 1 where the controller couples or uncouples
  - 2 an amplifier from the at least one radio based on whether the received transmission
  - 3 power of the amplifier is above or below the threshold transmission power.
- 1 3. The beam on demand system of claim 1 where the amplifier and a corresponding
  - 2 antenna element of the antenna array are coupled or uncoupled to or from the at least
  - 3 one radio.
- 1 4. The beam on demand system of claim 1 where the control signal is based on the
  - 2 transmission power level of a group of which the amplifier is a member and a
  - 3 threshold transmission power level established for the group.
- 1 5. The beam on demand system of claim where the control signal is based on the
  - 2 transmission power level of the amplifier and a threshold transmission power
  - 3 established for the amplifier.

1 6. The beam on demand system of claim 1 where the threshold is calculated by the  
2 controller and the threshold is based on the total average transmission power of a set  
3 of amplifiers from the plurality of amplifiers.

1 7. The beam on demand system of claim 1 where the at least one radio is switchably  
2 coupled to a set of amplifiers from the plurality of amplifiers and an amplifier is either  
3 removed from the set or added to the set based on the threshold transmission power of  
4 the set and the transmission power of the amplifier to be added or removed.

1 8. The beam on demand system of claim 1 where the controller is a Digital Signal  
2 Processor.

1 9. The beam on demand system of claim 1 where each amplifier output is coupled to  
2 an antenna element of the antenna array.

1 10. The beam on demand system of claim 1 where the switch matrix has N inputs and  
2 M outputs where N and M are integers equal to 1 or greater and M is greater than N.

1 11. The beam on demand system of claim 1 where such a system serves a cell that is  
2 part of a wireless communication system.

12. A method for automatically allocating system equipment of a communication  
system, the method comprising the steps of:

5 providing equipment so as to serve various portions of the communication  
system;

monitoring the equipment to determine capacity demands of the various  
portions; and

switching equipment between portions of the communication system to meet  
10 the capacity demands of the various portions.

13. The method of claim 12 where the step of monitoring equipment further  
comprises establishing capacity thresholds for the various portions of the  
communication system.

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14. The method of claim 12 where the step of monitoring equipment further comprises establishing a capacity threshold for each of the provided equipment.

15. The method of claim 12 where the step of switching equipment between portions of the communication system comprises automatically transferring a provided  
5 equipment from one portion to another portion to meet the capacity demands of one or both of the portions.

16. The method of claim 12 where the step of switching equipment between portions of the communication system further comprises the steps of:

determining the capacity demand of the portion of the communication system  
10 to which equipment is switched; and  
switching the equipment to the portion when the capacity demand of the portion is calculated to be below an established capacity threshold even after the equipment has been switched.

17. The method of claim 12 where the equipment being switched are amplifiers  
15 coupled to antenna elements of an antenna array and the amplifiers are switchably coupled to at least one radio via beam formers and a switch matrix where the capacity demands are represented by transmission power levels of the amplifiers and the various portions are sectors and/or sub-sectors of a cell of a wireless communication system.